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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,519	09/08/2003	Kenneth K. Smith	200205288-1	9154

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EXAMINER

HUR, JUNG H

ART UNIT	PAPER NUMBER
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2824

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/657,519

Applicant(s)

SMITH ET AL.

Examiner

Jung (John) Hur

Art Unit

2824

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 13-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 19-24 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/8/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: search history.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-12 and 19-24, drawn to a magnetic memory device, classified in class 365, subclass 158.
 - II. Claims 13-18, drawn to a method for storing/writing data to a magnetic memory device, classified in class 365, subclass 225.5.

2. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case, the magnetic memory device of Group I can be used in a materially different process than that of Group II (for example, post- or pre-heating, etc.).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

3. During a telephone conversation with Mr. Dan Hu on 21 October 2004, a provisional election was made without traverse to prosecute the invention of Group I, claims 1-12 and 19-24. Affirmation of this election must be made by applicant in replying to this Office action. Claims

Art Unit: 2824

13-18 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statement

5. Acknowledgment is made of applicant's Information Disclosure Statement (IDS) Form PTO-1449, filed 08 September 2003. The information disclosed therein was considered.

Specification

6. Claims 1 and 19 are objected to because of the following informalities:

Each of said claims recites "an array of a magnetic storage cells" which appears to be in error; it will be understood as --an array of magnetic storage cells--.

Claim 19 recites "each region" which lacks antecedent basis in the claim; it will be understood as --each cell--, as in claim 1.

Claim 19 recites "said at least one" in line 14 of the claim, which appears to be referring to --said at least one magnetic storage cell--, and it will be understood as such.

Appropriate correction is required.

Art Unit: 2824 .

7. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because it uses the phrase "is disclosed" which can be implied. It is suggested that "A memory device" be replaced with --In a memory device--, and "cells is disclosed. Each" be replaced with --cells, each--. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1-7, 10 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Nickel et al. (U.S. Pat. Appl. Pub. No. 2002/0089874).

Art Unit: 2824

11/1/04
Nickel, for example in Figs. 1-4, discloses an array (112 in Fig. 3) of magnetic storage cells (114), each cell comprising a first magnetic layer (12 in Fig. 1), a second magnetic layer (14), and a dielectric (16), a first set of conductors for writing (including 18), and a second set of conductors for heating (22); wherein the first set of conductors is electrically isolated (via 24) from the second set of conductors; wherein heating reduces the magnetic coercivity (see for example paragraph [0021]); wherein the array comprises spin tunneling storage cells (with an SDT junction; see for example paragraph [0016]) or giant magnetoresistive storage cells (with GMR effect; see for example paragraph [0015]), which comprise anisotropic magnetoresistive material (due to presence of "easy" axis; see for example paragraph [0016]); wherein said second conductor set includes a heater element (120b in Fig. 4) placed in series (120b in series with 120a in Fig. 4), wherein said heater element is a resistive device (see for example paragraph [0033]).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1, 8, 9, 19-21, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hidaka (U.S. Pat. No. 6,542,402) in view of Abraham et al. (U.S. Pat. No. 6,385,082).

Hidaka, for example in Fig. 20 with reference to Fig. 42, discloses a first magnetic layer (FL in Fig. 42, as applied to MTJ in Fig. 20) having a fixed orientation, a second magnetic layer (VL) having a non-fixed orientation, a dielectric (TB) (forming a spin tunneling storage cell MTJ); a first set of conductors positioned above (WWL in Fig. 20) and below (WBL) said first and second magnetic layers (of MTJ) for writing; and a second set of conductors above (RBL) and below (including 140) said first and second magnetic layers (of MTJ) for applying voltage across a said magnetic storage cell for reading.

However, Hidaka does not disclose that the second set of conductors are for heating with the magnetic storage cell serving as an electrical heating element. Also, Hidaka does not disclose an electronic device comprising such memory device, along with a processor, an input device and an output device.

Abraham, for example in Fig. 5, discloses applying a voltage (via 54) across a magnetic storage cell (50) for heating the cell, with the magnetic storage cell serving as an electrical heating element (column 5, lines 49-57).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Hidaka by applying a heating voltage via the existing second set of conductors during writing operations, for the purpose of reducing writing errors and therefore increasing the writing accuracy (see for example Abraham column 3, lines 26-30), with increased flexibility in controlling the storage cell heating (since heating conductors are separate from write conductors). Further, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the memory device of the Hidaka/Abraham combination in an electronic device comprising a processor, an input

Art Unit: 2824

device and an output device, since such electronic device was common and well known in the art.

12. Claims 12 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hidaka (U.S. Pat. No. 6,542,402) in view of Abraham et al. (U.S. Pat. No. 6,385,082) as applied to claims 1 and 19 above, and further in view of Kim et al. (U.S. Pat. Appl. Pub. No. 2003/0235072).

The Hidaka/Abraham combination discloses a memory device and an electronic device as in claims 1 and 19 above, with the exception of a resistive heating element in series with a magnetic storage cell. Kim, for example in Fig. 1, discloses a resistive heating element (50) in series with a magnetic storage cell (52a). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the storage cell of the Hidaka/Abraham combination by incorporating a resistive heating element in series with the storage cell (as in Kim), for the purpose of enhancing and improving the efficiency of the storage cell heating.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Leuschner (U.S. Pat. No. 6,704,220) discloses an MRAM with heating elements.

Abraham et al. (U.S. Pat. No. 6,724,674) discloses an MRAM with heating elements.

Tang (U.S. Pat. No. 6,744,651) discloses an MRAM with heating elements.

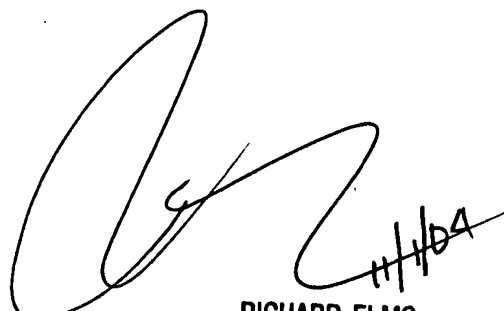
Art Unit: 2824

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jung (John) Hur whose telephone number is (571) 272-1870. The examiner can normally be reached on M-F 6:30 AM - 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on (571) 272-1869. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jhh

A handwritten signature in black ink, appearing to be 'Richard Elms', with a stylized flourish at the end.

RICHARD ELMS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800